

AMENDMENTS TO THE DRAWINGS

The attached sheet of drawings includes changes to Fig. 13. This sheet, which includes Fig. 13, replaces the original sheet including Fig. 13. In Fig. 13, previously omitted element 6 has been added.

REMARKS

This is in response to the Office Action dated March 21, 2008. Claims 1-2, 4-9 and 17-27 are pending. Claims 1, 5-9, 17-19, 22-24 and 26-27 stand rejected in the outstanding Office Action. Claims 1, 18 and 19 have been amended. Claims 2, 4, 20-21 and 25 have been cancelled.

The rejection of claims 1, 18 and 19, as allegedly being anticipated under 35 U.S.C. §102(a) over Applicant's Admitted Prior Art ("AAPA") is respectfully traversed. AAPA fails to disclose or even remotely suggest each and every limitation set forth in the claims. Anticipation requires that "each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference", *Verdegaal Bro. v. Union Oil Co. of California*, 814 F.2d 628, 631 (Fed. Cir. 1987) (MPEP § 2131).

Amended claims 1 and 19 now recite "wherein the aperture section in the pad electrode is larger than the aperture section in the field oxide film, when perpendicularly viewing the semiconductor substrate" as well as "an opening of the hole is smaller than the aperture section of the field oxide film". AAPA fails to teach or suggest this limitation.

With the amendment (incorporating the limitations of dependent claim 21, and those of its intervening claim 4) into claim 1, it is made clear that the aperture of the electrode pad is larger than the aperture of the field oxide film and the aperture of the field oxide film is larger than that of the hole in the substrate. Such structure is not present in the AAPA.

The Examiner alleged that the opening of the hole in the semiconductor substrate is smaller than the aperture section of the field oxide film in the device shown in Fig. 16 (representing AAPA), because "the opening of the hole is the width of the penetrating electrode 115, and does not include insulating layer 109", see p. 9 of the Office Action, whereas "[the]

aperture section of the field oxide film 102 being the width of layers 109 and 115". The above assertion is incorrect. The description of the formation of the device of Fig. 16 makes it clear that the width of the hole of the substrate is substantially equal to the sum of the width of the penetration electrode 115 and the width of the insulator film 109. For example, the specification, describing the device of Fig. 16, states "Note that an insulting film 109 is formed between the penetration electrode 115 and the semiconductor substrate 101", lines 7-9, p. 5. In other words, the substrate extends only up to the insulating film 109, and therefore the hole, which is defined as the lack of substrate material, does not include the insulating film 109.

In addition, as can be seen from Fig. 18, depicting the formation of the penetration electrode, the hole 106 formed in the substrate 101 is actually larger than the aperture 108b of the field oxide film 102. After the formation of the hole in the substrate, insulating layer 109 is applied in the interior of the hole (Fig. 19). From the above it is very clear that the hole width is more than the width of the penetrating electrode, and it is truly represented in Fig. 19. Therefore, AAPA fails to teach "an opening of the hole is smaller than the aperture section of the field oxide film" or "the aperture section in the pad electrode is larger than the aperture section in the field oxide film". In Fig. 16, the aperture section of the field oxide film 102 is the same as the aperture section of the pad electrode 104.

Regarding claim 18, AAPA (i.e., Fig. 17) does not show "an opening of the hole is smaller than the aperture section of the field oxide film", as required by claim 18. In fact, the hole in the substrate 101 has the same width as the aperture of the field oxide film 102.

The rejection of claims 1, 18 and 19 under 35 U.S.C. §103(a), as allegedly being unpatentable over Mashino et al. (US 6,699,787) in view of Uehara (US 5,262,671) and Ko (US 6,989,108), is respectfully traversed.

The Examiner cited Mashino as disclosing a device comprising a substrate 201 having a hole, a pad electrode 211 having an aperture section, and a penetration electrode 217 passing through the hole and the aperture section of the pad electrode. The Examiner acknowledged that Mashino fails to disclose a field oxide film with an aperture section, wherein the penetration electrode passes also through the field oxide film aperture, and the opening of the hole is smaller than the aperture section of the field oxide film. He then turned to Uehara for the missing limitation.

Uehara discloses a semiconductor device comprising various electrodes 4 on a substrate, wherein a field oxide film 2 is formed between substrate 1 and a pad electrode 6 (Fig. 2, lines 23-34, col. 4). Unlike the Examiner's assertion (p. 6 of the Office Action), the field oxide film lacks an aperture section. In addition, the pad electrode 6 lacks an aperture.

In contrast, in the device of claims 1, 18 and 19, the aperture of the field oxide film is larger than that of the hole in the substrate. Such structure is not obvious from any of Mashino or Uehara.

Ko apparently has been cited for disclosing field oxide regions on a semiconductor substrate and it does not provide any of the missing limitations in the combination of Mashino/Uehara.

For the above reasons, claims 1, 18 and 19 are allowable.

It is respectfully requested that the rejection of dependent claims 5-9, 17, 22-24 and 26-27, all dependent from claims 1 or 19, also be withdrawn.

In view of the foregoing and other considerations, all claims are deemed in condition for allowance. A formal indication of allowability is earnestly solicited.

DOTTA et al
Appl. No. 10/828,475
June 18, 2008

The Commissioner is authorized to charge the undersigned's deposit account #14-1140 in whatever amount is necessary for entry of these papers and the continued pendency of the captioned application.

Should the Examiner feel that an interview with the undersigned would facilitate allowance of this application, the Examiner is encouraged to contact the undersigned.

Respectfully submitted,

NIXON & VANDERHYE P.C.

By: /Leonidas Boutsikaris/
Leonidas Boutsikaris, Ph.D.
Reg. No. 61,377

LB:tlm
901 North Glebe Road, 11th Floor
Arlington, VA 22203-1808
Telephone: (703) 816-4000
Facsimile: (703) 816-4100